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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/014,371	12/11/2001	James Arthur Herbst	STL10474/40046.174USU1	1140
23552	7590	03/30/2004	EXAMINER	
MERCHANT & GOULD PC P.O. BOX 2903 MINNEAPOLIS, MN 55402-0903			SHAH, SAUMIL R	
			ART UNIT	PAPER NUMBER
			2186	3
DATE MAILED: 03/30/2004				

Please find below and/or attached an Office communication concerning this application or proceeding.

P24

**Office Action Summary****Application**

10/014,371

**Applicant(s)**

HERBST ET AL.

**Examiner**

Saumil Shah

**Art Unit**

2186

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 11 December 2001.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,4,6,7,9,10,12,15,18 and 19 is/are rejected.
- 7) ☒ Claim(s) 3,5,8,11,13,14,16,17 and 20 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>2, 12/11/2001</u> . | 6) <input type="checkbox"/> Other: _____  |

**DETAILED ACTION**

***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 12, 18 and 19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

a. With regard to claim 12, it is unclear what the term "value indicating a number of" means in lines 1-2. Further clarification is required since a threshold value usually stores a value against which other values are compared. In this case, the threshold value should be compared *against* the number of consecutive read commands.

b. With regard to claim 18, it is unclear what the term "value representing a number of" means in line 2. Further clarification is required since a threshold value usually stores a value against which other values are compared. In this case, the threshold value should be compared *against* the number of consecutive read commands.

c. With regard to claim 19, it is unclear what the term "value representing a number of" means in line 2. Further clarification is required since a threshold value usually stores a value against which other values are compared. In this case, the threshold value should be compared *against* the number of consecutive Write Direct Memory Access and flush cache command pairs.

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 2, 4, 15 are rejected under 35 U.S.C. 102(e) as being anticipated by Cai et al (US-PGPUB No. 2001/0049770).

a. With regard to claim 1, Cai et al discloses a method of optimizing cache management in a data storage device in operable communication with a host computer comprising the steps of:

(a) receiving a command from the host computer exhibiting a data usage pattern (note page 2 para [0021], lines 3-5 where the requests are commands from the execution entities);

(b) selecting a cache management algorithm based on the data usage pattern (note page 2 para [0022], lines 3-10 where some examples of selecting a cache management algorithm are given based on data usage pattern. A selection is made from these patterns); and

(c) employing the cache management algorithm to process the command (note page 2 para [0023], lines 3-10 where the EIDs are used to keep

track of the cache management algorithm used based on the cache module to process the requests).

b. With regard to claim 2, Cai et al discloses the method of claim 1 wherein the selecting step (b) comprises steps of:

(b)(i) updating a set of usage statistics in response to receipt of the command (note page 5 para [0054], lines 4-6).

(b)(ii) determining whether a change is detected in the data usage pattern (note page 5 para [0054], lines 6-8); and

(b)(iii) if a change is detected in the data usage pattern, selecting a cache management algorithm associated with the data usage pattern (note page 5 para [0054], lines 8-13 where an example of a change from FIFO replacement to LRU replacement is given).

c. With regard to claim 4, Cai et al discloses the method of claim 2 wherein the data storage device is a disc drive having a data disc and the selecting step (b)(iii) comprises the step of:

(b)(iii)(1) directing a cache management executive to execute the selected cache management algorithm (note page 5 para [0054], lines 12-15 where the P-cache module configuration is dynamically changed).

d. With regard to claim 15, Cai et al discloses a data storage device comprising:

a cache for buffering commands and data (note page 1 para [0003], lines 1-4); and

a means for adaptively selecting a cache management algorithm based on the command data (note page 5 para [0054], lines 13-16 where the command data is given by the execution entities).

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cai et al (US-PGPUB No. 2001/0049770).

a. With regard to claim 7, Cai et al discloses everything as is described for claim 1 above.

Cai et al fails to disclose the method wherein the data storage device is a disc drive having a disc storing sets of cache management algorithms, the method further comprising steps of:

(d) copying the sets of cache management algorithms from the data disc to memory.

Cai et al, however, teaches storing applications, operating system modules or routines, device drivers, BIOS modules or routines, and interrupt handlers, may be stored in one or more storage media which could be flash media, EEPROMs, fixed disks etc. Cai et al further teaches that the instructions stored in the storage media when executed cause the system to perform

programmed acts (note page 4, para [0043]). Furthermore, these instructions are loaded into the system (note page 4, para [0044], lines 1-2).

Cache management algorithms are instructions when executed cause the cache to perform in a certain manner.

Hence, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have copied the sets of cache management algorithms from the data disc to the memory of Cai et al since this would have stored the algorithms in a permanent location on discs and loaded into the memory when required and thus saving cache space on the system.

5. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cai et al (US-PGPUB No. 2001/0049770) in view of Chang (US Patent No. 5,805,863).

a. With regard to claim 9, Cai et al discloses a cache manager for managing caching in a data storage device comprising:

a usage statistics module storing statistics with a sequence of commands received by the data storage device (note page 5 para [0054], lines 4-6 where the statistical information may be collected and stored);

Cai et al fail to disclose the feature of:

a configuration module storing one or more sets of pattern data indicative of predetermined patterns of command sequences; and  
a correlator accessing the usage statistics module and the pattern data in the configuration module and correlating the usage statistics with the

pattern data to determine a match between the usage statistics and one of the sets of pattern data.

Chang teaches a cache manager comprising:

a configuration module storing one or more sets of pattern data indicative of predetermined patterns of command sequences (note column 4, lines 18-20 where the sets of conditions are provided and it is inherent that they are stored somewhere); and

a correlator accessing the usage statistics module and the pattern data in the configuration module and correlating the usage statistics with the pattern data to determine a match between the usage statistics and one of the sets of pattern data (note column 4, lines 3-5 where the sets of conditions represent criteria of selecting between the various configurations).

Hence it would have been obvious to one of ordinary skill in the art at the time the invention was made to have a configuration module to store pattern data and a correlator to correlate the usage statistics with the pattern data as taught by Chang in the system of Cai et al since this would have made the change of configuration of the cache much faster and easier by having the data patterns stored in the configuration module and having a correlator whose sole task is to correlate the data and usage statistics.



b. With regard to claim 10, the combined system of Cai et al/ Chang discloses everything as is described for claim 9 above. Chang further teaches a statistics-gathering module operably connected to the usage statistics module for gathering statistics related to the received sequence of commands (note column 4, lines 8-9 where the various performance parameters are collected). Cai et al further teaches transmitting the statistics to the usage statistics module (note page 5 para [0054], lines 4-6 where the statistical information is stored).

***Allowable Subject Matter***

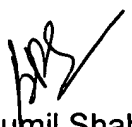
6. Claims 3, 5, 11, 13, 14, 16, 17, 20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7. Claims 12, 18, 19 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Saumil Shah whose telephone number is 703-305-8786. The examiner can normally be reached on 9:00 AM to 5:30 PM M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matt Kim can be reached on 703-305-3821. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Saumil Shah  
Patent Examiner  
AU: 2186

March 18, 2004



BEHZAD JAMES PEIKARI  
PRIMARY EXAMINER